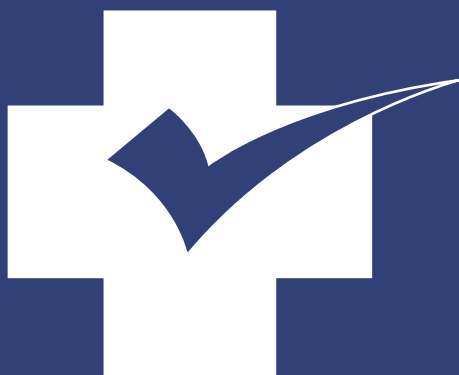


Virginia
Wellness
Related
Fitness
Testing
Program



The Virginia Wellness-Related Fitness Testing Program

The goals of The Virginia Wellness-Related Fitness Test (VWRFT) are to promote enjoyable regular physical activity and to provide a wellness-related fitness assessment and baseline data for Virginia's youth. Wellness-related fitness is comprised of several components: (1) aerobic capacity, (2) muscular strength, endurance, and flexibility, and (3) body composition.

In the past, national physical fitness programs have emphasized attainment of high levels of performance. While admirable, extremely high levels of physical fitness, are not necessary for Virginia's students to maintain good health and improved daily function.

In a free society, individuals choose what they want to emphasize and where they want to strive for excellence. Some students will decide to make such an effort in music, math, art, science or drama; others, e.g. athletes, will give high priority to physical activity and fitness. Recognizing this as proper, it is hoped that the VWRFT will motivate all students in Virginia to achieve a level of activity and fitness associated with excellent health, growth, and function necessary for academic achievement.

A quality Health and Physical Education program seeks to develop affective, cognitive, and behavioral components for all students, regardless of gender, age, disability, or any other factor. Virginia endorses the concept that physical activity should be fun and enjoyable. Regular physical activity contributes to good health, function, learning, and well-being, and is important throughout a person's lifetime. Therefore, school programs should have the long-term view of promoting appropriate physical activity rather than focusing only on developing "athletic" physical fitness. The VWRFT emphasizes maintaining an acceptable level of physical fitness.

Wellness-Related Fitness Testing Objectives

The Virginia Wellness-Related Fitness Test (VWRFT) is designed to evaluate and provide baseline wellness-related fitness data for Virginia's students. A school's or agency's philosophy of fitness evaluation will determine how the test is administered.

Provide Information On Individual Fitness Level

One of the primary objectives of fitness testing is to provide students, teachers, and parents with information regarding the student's current fitness status. This fitness information can then be used as the basis for designing a personal, individualized fitness development program for each student.

When the purpose of testing is to provide students with personalized information, several assessments approaches may be used.

- The traditional approach is to have a teacher or a trained adult conduct the student assessments. Attention is focused on correct protocol and teacher interactions that motivate students to achieve their best performance.
- Self testing is the more contemporary student-centered approach. Students learn the process and concepts of fitness testing and are then able to evaluate their fitness status throughout life. They select a testing partner and the two work together to evaluate each other's fitness. Testing stations are established and students rotate from one station to another and record their results. Teachers provide encouragement, clarify testing objectives, and praise for correct testing procedure as well as performance.
- To reduce testing time, teachers may elect to have students stop the test when they have achieved a score in the upper limit of the Wellness Zone (WZ). This may also reduce the possibility of embarrassment and avoid creating a threatening environment for less capable students. If this approach is used, parents should be informed about the process so that they understand that the performance reported on the VWRFT does not represent a maximal effort. Also, if performance during class time does not allow for maximal effort it is recommended that those more highly motivated students be provided with the opportunity to do a maximal test at some other time. An example of this is an after school fitness challenge for high-level performers.

To Provide Information For Program Evaluation

2

A second objective of fitness assessment may be to determine if the program is achieving its stated fitness goals. A teacher should determine the percentage (e.g., 80%) of students that should achieve the Wellness Zone or above. If the resulting percentage falls below the stated goal, emphasis in the curriculum should be adjusted accordingly.

Testing for program evaluation should be done in an efficient and accurate manner. A suggested approach is to train a group of volunteers to assist the teacher and/or student in administering test items and generating a statistical report.

Test Administration

The VWRFT assessment measures two components of fitness identified as being important because of their relationship to overall wellness, optimal function, and learning. The two components are aerobic capacity; and muscular strength, endurance, and flexibility. Although body composition is a vital component of wellness-related fitness, it is not required in the VWRFT due to the sensitive assessment issues surrounding this component. However, school divisions that elect to assess body composition can find assessment procedures in Appendix A.

Several test options are provided for each component. **Each school division should establish procedures (division, school, teacher, and/or student) to determine if all or some of the test items will be selected.** This section describes procedures for administering, scoring and reporting test items. Table 1. provides a summary of the test items.

Table 1. The Virginia Wellness-Related Fitness Test Items

ABDOMINAL STRENGTH

Select one of the following options:

Curl -Up Test (one minute)

Curl -Up Test (cadence)

Partial Curl -Ups

AEROBIC CAPACITY

Select one of the following options:

The PACER

One Mile Run/Walk

1/2 Mile Run/Walk (3rd & 4th grade)

1/4 Mile Run/Walk (1st & 2nd grade)

UPPER BODY STRENGTH

Select one of the following options :

Push-Ups

Pull-Ups

Flexed Arm Hang

FLEXIBILITY

Select one of the following options:

Back-Saver Sit and Reach

V - Sit Reach

Sit and Reach

Safety Considerations

The tests items used in VWRFT have been administered to millions of students and have proven to be very safe. Never the less, the prudent teacher, however, will recognize that with any strenuous physical activity the possibility of injury exists. Your school division should have established policies related to medical information, medical records, and medical clearance for activity. It is important that you are aware of these policies and that you follow them strictly.

Prior to conducting the VWRFT, or any other youth fitness test, it is vital that teachers are aware of any potential student health problems. Some students may have congenital heart conditions or other health conditions that may require special considerations during the administration of an aerobic capacity measure, or other fitness assessments. Maximizing the safety of all students should be of foremost consideration.

Instructions for Administering Virginia's Wellness-Related Fitness Test

Physical fitness assessment is most effective when it is part of a comprehensive health and physical education program that supports assessment with educational and motivational information. The success of the program depends on the enthusiasm and knowledge of physical educators and other youth leaders.

Wellness-related Fitness Components

Muscle Strength, Endurance, And Flexibility

Tests of muscular strength, muscular endurance, and flexibility are combined into one broad fitness category to determine the status of the musculoskeletal system. It is equally important to have strong muscles that can work forcefully over a period of time and are adequately flexible to allow full range of motion at the joint. Musculoskeletal injuries many times result from muscle imbalance at a specific joint; the muscles on one side may be much stronger than the opposition muscles or may have inadequate flexibility to allow complete motion or sudden motion to occur.

It is important to remember that the specificity of training is applicable to the development of musculoskeletal strength, endurance, and flexibility. The movements included in these test items are only a sampling of the many ways that the body is required to move and adjust during physical activity.

The upper body and the abdominal/trunk region have been selected as areas for testing because of their perceived relationship to maintaining functional health and correct posture, thereby reducing possibilities of future low back pain and restrictions in independent living. Although most students will not have weaknesses sufficient to cause current problems it is important to educate them regarding the importance of muscle strength, endurance, and flexibility in preventing problems as adults. It is especially important to make students aware of correct postural alignment and body mechanics in the event that they are developing scoliosis - a potential health problem for teenage youth. The school nurse, a physician, or a physical therapist are good sources for information and treatment.

1. Abdominal Strength And Endurance Tests

Strength and endurance of the abdominal muscles are important in promoting good posture and correct pelvic alignment. The latter is particularly important in the maintenance of low back health.

In testing and training the muscles of this region it is difficult to isolate the abdominal muscles. It is important to note that when compared to a full sit-up with the feet held, curl-ups do not involve the assistance of the hip flexor muscles and minimizes compression in the spine, when compared to a full sit-up with the feet held.

1a. Curl-Ups (one minute)

Objective: To measure abdominal strength by maximum number of curl-ups performed in one minute.

Equipment: Stopwatch, mat, or other clean and cushioned surface.

Testing: Have student lie on cushioned, clean surface with knees flexed and feet about 12



inches from buttocks. Partner holds feet. Arms are crossed with hands placed on opposite shoulders and elbows held close to chest. Keeping this arm position student raises the trunk, curling up to touch elbows to thighs and then lowers the back to the floor so that the scapulas (shoulder blades) touch the floor, for one curl-up. To start, a timer calls the signal “**Ready? Go!**” and begins timing student for one minute. The student stops on the word “**stop.**”

Rules: “Bouncing” off the floor is not permitted.

Scoring: The number of curl-ups performed correctly in one minute.

1b. Curl-Ups (cadence)

Objective: To measure abdominal muscle strength by maximum number of curl-ups in rhythm.

Equipment: Mat or other clean and cushioned surface, marking tape (3" wide for K-4th grades, and 4 1/2 " wide for 5th-12th grades), and a metronome (or audio tape).

Testing: A strip of marking tape 3" (grades K-4) or 4 1/2 " (grades 5-12) wide should be placed on the floor. Have student lie on cushioned surface with knees flexed and feet about 12 inches from buttocks. The feet are **NOT** held or anchored. Arms are extended forward with fingertips at edge of tape. The student's partner is behind the head with hands cupped under the student's head. The student being tested curls up slowly sliding the fingertips past the tape (3 or 4 1/2 inches), then back down until the head touches the partner's hands. The curl-ups are done to a metronome, audio tape, or to the test administrator's “**Up, Down**” command; with one complete curl-up every three seconds, and are continued until the student has not done the last three in rhythm.

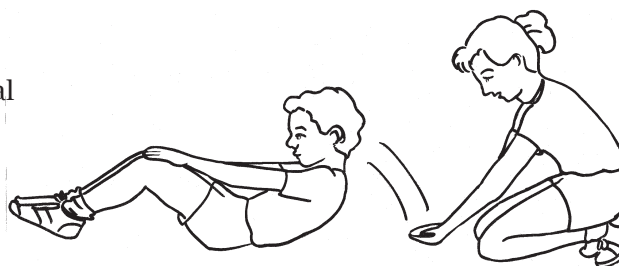
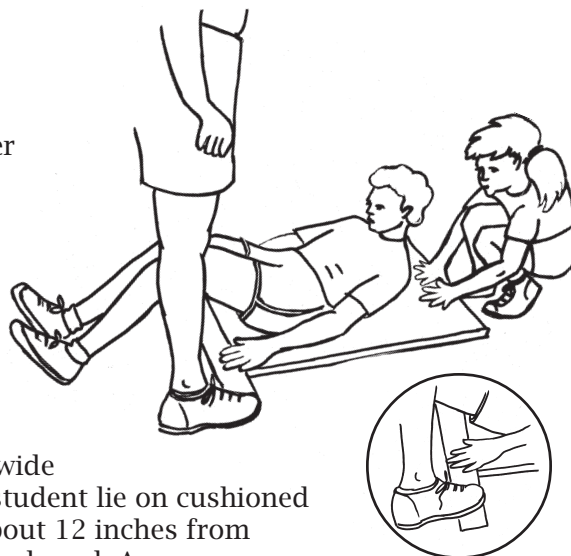
Scoring: Record only those curl-ups done with proper form and in rhythm.

1c. Partial Curl-Ups

Objective: To measure abdominal strength by maximum number of curl-ups.

Equipment: Mat or other clean and cushioned surface, metronome (or audio tape).

Testing: Have student lie on clean, cushioned surface with knees flexed and feet about 12 inches from buttocks. The feet are **NOT** held or anchored. Arms are



extended forward with fingers resting on the legs and pointing toward the knees. The student's partner is behind the head with hands cupped under the student's head. The student being tested, curls up slowly, sliding the fingers up the legs until the fingertips touch the knees, then back down until the head touches the partner's hands. The curl-ups are done to a metronome (or audio tape), with one complete curl-up every three seconds, and are continued until the student has not done the last three in rhythm.

Scoring: Record only those curl-ups done with proper form and in rhythm.

Rationale: The new partial (abdominal) curl-ups, done slowly with knees bent and feet not held, are a better indicator of the strength and endurance of the abdominal muscles than the times curl-ups.

Appendix B provides the standards to determine if a student is within the abdominal strength Wellness Zone

2. Upper Body Strength Test

2a. Pull-Ups

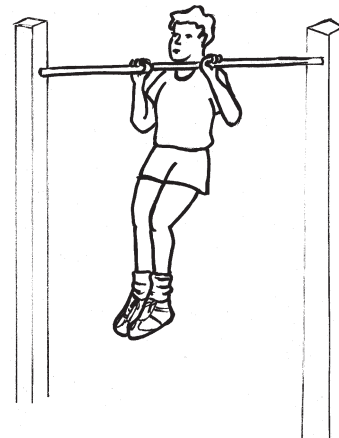
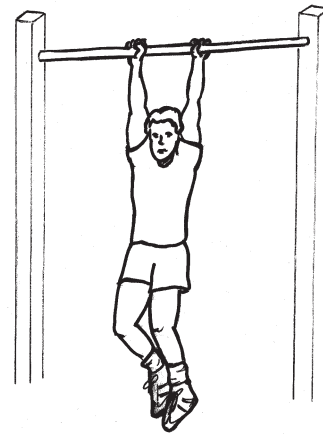
Objective: To measure upper body strength by maximum number of pull-ups completed.

Equipment: A horizontal bar approximately one and one-half inches in diameter at a height from which the student can hang with arms fully extended and feet off the floor.

Testing: Student hangs from a horizontal bar with arms and body fully extended, feet free from floor, using an **overhand grasp** (palms facing away from body) or an **underhand grip** (palms facing toward the body). Small students may be lifted to starting position. Student raises body until chin clears the bar, and then lowers body to full-hang starting position. Student performs as many correct pull-ups as possible.

Rules: Pull-ups should be done in a smooth rather than a jerky motion. Kicking or bending the legs is not permitted, and the body should not swing during the movement.

Scoring: Total number of pull-ups that student performs correctly.

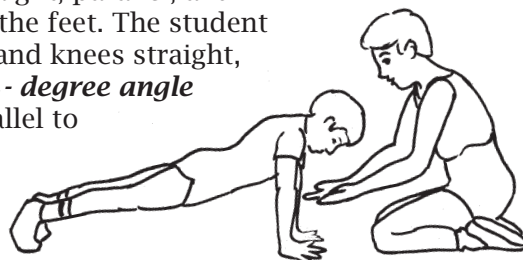
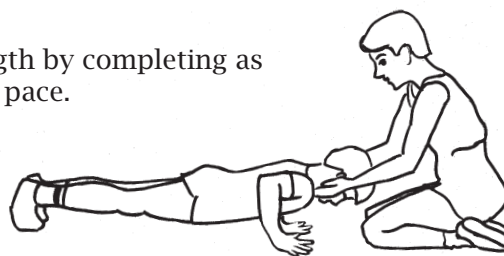


2b. Right Angle Push-Ups

Objective: To measure upper body strength by completing as many push-ups as possible at a rhythmic pace.

Equipment: Mat or other clean and cushioned surface, metronome, or audio tape .

Testing: The student lies face down on the cushioned surface in push-up position with hands under shoulders, fingers straight, and legs straight, parallel, and slightly apart, with the toes supporting the feet. The student straightens the arms, keeping the back and knees straight, then lowers the body until there is a **90 - degree angle at the elbows**, with the upper arms parallel to the floor. A partner holds her/his hands at the point of the 90 - degree angle so that the student being tested goes down only until her/his shoulders touch the partner's hands, then back up again. **The push-ups are performed to a metronome, audio tape, or to the test administrator's "Up, Down" command, with one complete push-up every three seconds, and are continued until the student has not done the last three on pace.**



Scoring: Record only those push-ups done with proper form and in rhythm.

Rationale: The right angle push-ups are recommended for upper body strength testing because the student's body weight has less effect than it does on pull-ups. Right angle push-ups incorporate the use of all upper body muscles, therefore providing a better indicator of student's strength/endurance; whereas many are unable to do any pull-ups.

2c. Flexed-Arm Hang

Objective: To measure upper body strength by maintaining the flexed-arm hang position as long as possible.

Equipment: A horizontal bar approximately one and one-half inches in diameter placed at a height from which the student can hang with arms and legs fully extended and feet off the floor, and a stopwatch.

Testing: Using either the underhand or overhand grip, the student assumes a flexed-arm hang position with chin clearing the bar. A student may be lifted to this position. Student, on the start signal, holds this position as long as possible.



Rules: Chest should be held close to the bar and legs should be hanging straight. Time stops when student's chin touches or falls below the bar.

Scoring: Record the number of seconds/minutes the student maintains the proper flexed arm hanging position.

Appendix B provides the standards to determine if a student is within the upper body strength Wellness Zone

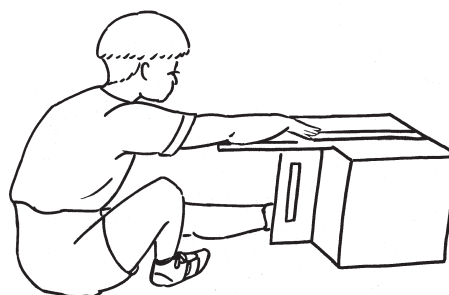
3. Flexibility Tests

Maintaining adequate joint flexibility is important to functional health. Decreased flexibility is generally not a significant health problem for young people. However, students need to understand the importance of maintaining flexibility and range of motion as they age.

3a. Back-Saver Sit and Reach

Objective: To measure hamstring flexibility by reaching as far as possible on the right and left sides of the body.

Equipment: This assessment requires a sturdy box approximately 12-inches high (fourfold mats may be stacked to 12-inches in lieu of "the box"), measuring scale (yardstick/tape measure).



Set-Up: The measuring scale is placed on top of the box (mats) with the 9-inch mark even with the near edge of the box. The "zero" end of the ruler is nearest the student

Testing: The student removes his/her shoes and sits down in front of the test apparatus. One leg is fully extended with the foot flat against the end of the box. The other knee is bent with the sole of the foot **flat** on the floor and 2 to 3 inches to the side of the straight knee. The arms are extended forward over the measuring scale with the hands placed one on top of the other. With palms down, the student reaches directly forward with both hands along the scale four times and holds the position of the **fourth** reach for at least 1 second. After measuring one side, the student reverses the position of the legs and reaches again.

Rules: The bent knee may move slightly to the side as the body moves by it.

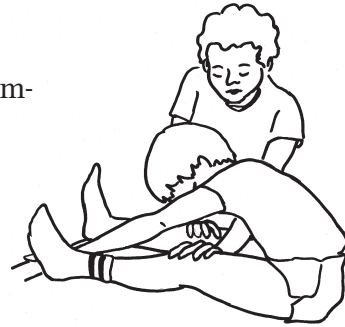
Scoring: Record the **highest** number of inches reached (either side of the body) to the **last whole inch**.

3b. V-Sit Reach

Objective: To measure flexibility of lower back and hamstrings by reaching forward in the V position.

Equipment: A clean surface, measuring scale (yardstick and/or tape measure).

Set-Up: A straight line, two-feet long, is marked on the floor as the baseline. A measuring line is drawn perpendicular to the midpoint of the baseline extending two feet on each side and marked off in half-inches. The point where the baseline and measuring line intersect is the "0" point.



Testing: The student removes shoes and sits on floor with measuring line between legs and soles of feet placed immediately behind baseline, heels 8-12 inches apart. Student clasps thumbs so that hands are together, palms down, and places them on measuring line. With the legs held flat by a partner, student slowly reaches forward as far as possible, keeping feet on baseline and flexed. After three practice tries, the student **holds the fourth reach** for **three seconds** while the distance reached is recorded.

Rules: Legs must remain straight with soles of feet held perpendicular to the floor (feet flexed). Students should be encouraged to reach slowly rather than "bounce" while stretching.

Scoring: The score is recorded to the nearest half-inch, and is read as plus scores for reaches beyond baseline, minus scores for reaches behind baseline.

9

3c. Sit and Reach

Objective: To measure flexibility of lower back and hamstrings by reaching as far as possible with the fingertips.

Equipment: This assessment requires a sturdy box approximately 12-inches high (fourfold mats may be stacked to 12-inches in lieu of "the box"). A measuring scale (meter stick) is placed on top of the box with 23 centimeters at the level of the feet.



Testing: Student removes shoes and sits on floor with knees fully extended, feet shoulder-width apart and soles of the feet held flat against the end of the box (mats). With hands on top of each other, palms down, and legs held flat, student reaches along the measuring line as far as possible. After **three practice reaches**, the **fourth reach is held** while the distance is recorded.

Rules: Legs must remain straight, soles of feet against box, and fingertips of both hands should reach evenly along measuring line.

Scoring: Scores are recorded to the nearest centimeter.

Appendix B provides the standards to determine if a student is within the flexibility Wellness Zone

4. Aerobic Capacity Tests

Aerobic capacity is perhaps the most important area of any fitness program. Research clearly indicates that acceptable levels of aerobic capacity are associated with a reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some forms of cancer and other health problems in adults (Blair et al, 1989; Blair et al, 1992).

Aerobic capacity relative to body weight is considered to be the best indicator of a person's overall cardiorespiratory capacity. Many terms have been used to describe this dimension of physical fitness including cardiovascular fitness, cardiorespiratory fitness, cardiorespiratory endurance, aerobic fitness, aerobic work capacity, and physical working capacity. Although defined somewhat differently, these terms can generally be considered to be synonymous with aerobic capacity. A laboratory measure of maximal oxygen uptake is generally considered to be the most accurate measure of aerobic capacity.

4a. One-Mile Run/Walk

Objective: To measure heart/lung capacity by fastest time it takes to cover a one-mile distance.

Equipment: Stopwatch, a safe one-mile measured course.

Testing: On a safe one-mile course, students begin running on the count "Ready? Go!" Walking may be interspersed with running. However, the students should understand that the objective is to cover the distance as fast as possible.

Rules: Before administering this test, students' health status should be reviewed. Students should be given ample instruction on how to pace themselves and should be allowed to practice running this distance against time. Sufficient time should be allowed for warming up and cooling down before and after the test.

Scoring: The score is the time it takes to complete the run, and is recorded in minutes and seconds.

Distance Option for 1st and 2nd graders ONLY : 1/4 mile

Distance Option for 3rd and 4th graders ONLY: 1/2 mile.

Objective: The same as for the one-mile run.

Equipment: Stopwatch and appropriate measured distance course.

Testing: The same as for the one-mile run.

Rules: The same as for the one-mile run.



Scoring: The same as for the one-mile run

Rationale: Shorter distance runs are included as options for younger children. Younger children can be prepared to run the mile; however, some teachers find it easier to administer a shorter run which does provide good information on aerobic capacity of young children.

4b. PACER (*Progressive Aerobic Cardiovascular Endurance Run*) (5th through 12th grades)

Objective: To determine aerobic capacity by running as long as possible back and forth across a 20 - meter (21 yards and 32 inches) course at a specified pace which gets faster each minute.

Equipment: Cassette tape player with adequate volume, pre-recorded tape with timed “beeps,” marker cones, tape, a flat, nonslippery surface at least 20 - meters (21 yards and 32 inches) in length.

Set-Up: Mark the 20 - meter (21 yards and 32 inches) course with marker cones and a tape line at each end. Calibrate cassette tape by using the 1 - minute test interval at the beginning of the tape.

Testing: On the signal, **Ready? Go**, the student runs from one end of the course to the other between each beep. The student continues in this manner until he/she can no longer reach the line before the **beep** sounds. The student reverses the direction on the beep (even if he/she has not reached the line). Allow a student to attempt to catch up with the pace until he/she has missed two beeps. The student is stopped after being unable to reach the line two times (not necessarily in succession). Students who have missed two laps should walk from the testing area to a designated cool-down area, being careful not to interfere with others who may still be running.

Rules: Students should be allowed at least two practice sessions. First allow students to listen to several minutes of the tape so they know what to expect. Then perform a couple of practice runs. Allow students to select a partner.

Scoring: The score is the total **number of laps completed** by each student. Single beeps indicate the end of a lap (20-meter course).

Suggestions for Test Administration

The PACER test contains 21 levels (21 minutes). During the first minute (level one) of the PACER the student has **nine seconds** to run the distance (20 meters). Each minute (level) the pace increases by **one-half second**.

LEVELS	TIME TO COMPLETE 20 METERS	LEVELS	TIME TO COMPLETE 20 METERS
1	9 seconds	7	6 seconds
2	8.5 seconds	8	5.5 seconds
3	8 seconds	9-12	5 seconds
4	7.5 seconds	13-15	4.5 seconds
5	7 seconds	16-19	4 seconds
6	6.5 seconds	20-21	3.5 seconds

Caution the students not to begin too fast. The beginning speed is very slow. Nine seconds are allowed to run the 20 meter distance during the first minute.

If a student cannot reach the line in the allotted time, he/she should be given **two more intervals to attempt to regain the pace before being withdrawn.**

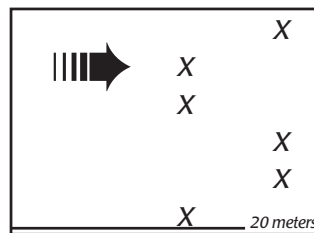
Appendix B provides the standards to determine if a student is within the Aerobic Capacity Wellness Zone

1. Ready, Begin



O O O O O O

2. Run to other end



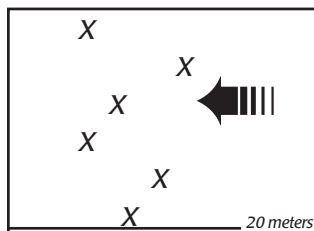
O O O O O O

3. Beep



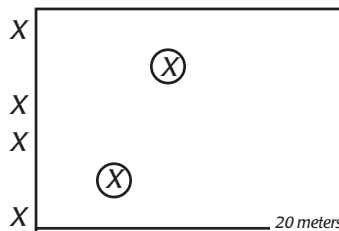
O O O O O O

4. Run to other end



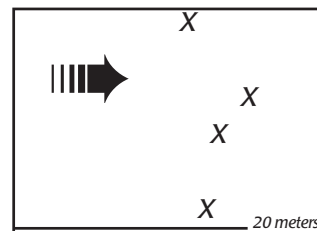
O O O O O O

5. Beep



O O O O O O

6. And so on . . .



O O O O O O X X

X = Runner
O = Observer

Instructions for Reporting the Data

The following information is reported to the Department of Education on the School Summary Form (Appendix C):

1. Results are to be recorded by AGE.
- 2.. For each fitness component:
 - the number of students that meet/exceed the wellness zone criteria for their AGE.
 - the number of students that took each test.
3. Number of students enrolled in each grade tested (4-12).
4. For elementary, middle and high school:
 - the student/Physical Education teacher ratio.
 - the number of times per week a student has health and physical education with a Physical Education specialist.
5. Return forms by June 15th to:
 - Virginia Department of Education
 - Specialist: Health, Physical Education and Driver Education
 - P.O. Box 2120
 - Richmond, Virginia 23218 -2120

Modification For Special Populations

Other sections of the VWRFT manual are intended for use with students who are not disabled. The teacher will, in many situations, also be working with students who may need assessment modifications. General and specific suggestions are provided for modifying testing procedures so that the physical fitness needs of the disabled student can be adequately addressed.

Specific criterion standards for disabled students are not available. The activities described within this section may be used to establish an individual baseline for each student. Performances on subsequent assessments can be compared to this baseline performance. Teachers can also use the baseline data as a guideline in establishing individual goals which may be used as a “standard” for the individual. Essentially, it is possible to use any task as the assessment by establishing a baseline and comparing progress back to that baseline performance. Teachers needing assistance in developing tasks for an assessment may want to consult the excellent resource by Winnick and Short (1985), *Physical Fitness Testing of the Disabled: Project Unique*.

Test Administration

On days preceding the assessment, it is appropriate for students to practice the test items. If, for any reason, the teacher suspects that the disabled student does not understand the administration of a test, instruction and practice should be provided. Of special concern is ensuring that the student understands the verbal instructions. Verbal descriptions presented to disabled students are often interpreted differently than when presented to the nondisabled. This is due to differences in previous movement and/or motor learning experiences. As disabled students become familiar with the specific procedures of the physical fitness test items, and as the fitness status of disabled students is assessed at regular intervals, the need for practice time will diminish.

Aerobic Capacity

The aerobic capacity test presents two problems for disabled students. First, some students are simply not able to run. Conditions that may preclude running include those requiring a wheelchair, braces, or other assistive devices for mobility, leg amputation, congenital anomalies, arthritis, and some vision impairments. Second, some students can not safely participate in a maximal or near maximal cardiorespiratory system test. For these students, a submaximal assessment should be completed. Acute asthma, cystic fibrosis, and some congenital coronary conditions would be examples of conditions under which maximal tests should not be used.

In cases where the student is unable to run, there are a number of alternatives. In maximal aerobic capacity assessments, the objective is to have a large muscle mass completing moderate to heavy exercise for an extended period of time. The mode of exercise is not particularly important as long as a large muscle mass is involved. Swimming, stationary bicycling using the arms or the legs to pedal, propelling a wheelchair, and walking are examples of exercise that requires a large muscle mass. Although standards for these activities are unavailable, improvements in performance subsequent to conditioning may be accepted as adequate improvements in aerobic capacity.

Swimming

If the teacher elects to use swimming as the mode of exercise, the student should possess swimming skills, or may need to use a flotation device. If a flotation device is used, the teacher should see that the student uses the same device in all subsequent assessments. The distance of the swim should be 300 yards for younger elementary students, 400 yards for upper elementary students, 500 yards for junior high students, and 700 yards for high school students. The score on the test is the amount of time taken to complete the distance. Standards are unavailable, but improvements in time subsequent to conditioning are accepted as improvements in aerobic capacity.

Stationary Bicycle

In using the stationary bicycle, pedaling may be done with the arms or the legs. The stationary bicycle used must be constructed so that exact work load or distance covered can be determined. With the resistance set at a moderate level, the student makes as many pedal revolutions as possible in five minutes. The number of pedal revolutions or the distance covered during the five-minute period is the score for the test. The resistance should remain constant in subsequent testing sessions.

Propelling a Wheelchair

If the student is propelling a wheelchair, the goal is to cover a specific distance in the minimal amount of time. For younger elementary students, the distance should be 600 yards, older elementary students should use 800 yards, junior high students 1200 yards, and high school students one mile. When assessment is repeated the teacher should make certain the student uses the same wheelchair and the same facility. Changes in the wheelchair or the testing surface will make comparisons to previous trials invalid. The score is the time required to cover the distance.

Walking

In walking, younger elementary students should walk 600 yards, older elementary students should walk 800 yards, junior high students should walk 1200 yards, and high school students should walk one mile. Near maximal exercise is approximated if the distance is covered in the minimal amount of time possible.

The recommendations presented above are for disabled students whose condition allows for maximal or near maximal estimates of aerobic capacity. The distances are arbitrary selections and may be modified based on individual capabilities. The results of the assessment are not comparable to performances on the one mile run/walk. The assessment is, however, important to the disabled student because when the assessment is repeated, improvement in performance is probably due to an improvement in aerobic capacity. If, on the other hand, there is considerable deterioration in the performance during the subsequent assessment, the deterioration may be due to a decrease in aerobic capacity.

If a student has a disability where a maximal or near maximal effort puts the student at risk, the criteria for selecting the intensity of the exercise must be modified. For students at risk, the recommended modification is to change the rate of work so that the student uses a large muscle mass to work at a mild rate for an extended period of

time. In this case, the heart rate during exercise should not exceed 120 beats per minute. Stationary bicycling, walking, running or swimming may be used as the mode of exercise. The teacher selects a pace that will maintain the student's heart rate below 120 beats per minute and the student completes the exercise period as indicated above for those not at risk. During the first ten to fifteen seconds of post-exercise, the teacher monitors the student's heart rate. During subsequent assessments, if the student covers the same distance in the same period of time, and the monitored heart rate is lower, this may be taken as an indication that the aerobic capacity has probably improved. An increase in the monitored heart rate may be an indication of a deterioration in aerobic capacity.

Muscle Strength, Endurance, And Flexibility

Virtually any movement may be used as a test of muscular strength and flexibility. Students may be asked to do the movement as many times as they can with or without a time limit or to do a certain number of repetitions. Students with motor control problems will probably need to have any timing factors removed from the assessment as long as the movement is rhythmic and student does not pause longer than 2 seconds between repetitions. Some students may need more warm-up prior to attempting a flexibility test. The important consideration is to establish a baseline performance which may be used as a basis of comparison to determine progress in strength development.

Interpreting Results

The Virginia Wellness-Related Fitness Test uses the Prudential FITNESSGRAM and the President's Challenge standards to assess fitness performance. These standards represent a level of fitness that offers some degree of protection against sedentary lifestyle diseases. Performance is classified in two general areas: **"In Progress"** and **"Within the Wellness Fitness Zone" (WZ)**. Appendix B provides the grade level WZ standards. All students should strive to achieve a score that places them within the WZ limits. Students who desire to achieve a high level of "athletic fitness performance" may need to consider setting goals beyond the WZ. Students, especially younger students, may need assistance in setting realistic goals.

WITHIN the WELLNESS - RELATED FITNESS ZONE (WZ)

In Progress	Good → → → <i>Achieved</i> → → → Excellent
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Current criterion reference research findings were used as the basis for establishing the Prudential FITNESSGRAM health fitness standards; and 1985 norm reference research was used to establish the President's Challenge standards. With regard to aerobic fitness levels, Blair, et al. (1989) reported a significant decrease in risk of all-cause mortality results from getting out of the lower 20 percent of the population. He also reports that risk level continues to decrease as fitness levels increase, but not as dramatically as simply getting out of the bottom 20 percent. Aerobic capacity standards for the WZ were established so that the lower end of the WZ corresponds closely to a fitness level equal to getting out of the lower 20 percent of the population, or equal to the 50th percentile on the President's Challenge. The upper end of the WZ corresponds to a fitness level that would include up to 60 percent of the population or the 85th percentile on the President's Challenge.

Little or no data exist to indicate levels of musculoskeletal fitness associated with good health. Standards in this area of fitness were established to correspond in level as closely as possible to those in aerobic capacity.

In interpreting performance on physical fitness assessments, it is most important to remember the following:

- the physical fitness experience should always be fun and enjoyable, the student should demonstrate an understanding of the importance of each fitness component,
- physical fitness testing should not become a competitive sport,
- the performance of one student should not be compared to that of another student,
- the primary reason for testing is to provide the student with personal information that may be used in planning a personal fitness program, and
- the performance level of fitness tests should not be used as a basis for grading.

Influence Of Body Size And Maturity On Fitness

Body size (height and weight), to some extent, effects fitness measurements. Although there is much variability among individuals, the influence of body size on fitness is especially apparent in two ways:

1. Excess weight associated with fatness tends to have a negative influence on aerobic capacity and on test items in which the body must be lifted or moved (e.g., upper body strength tests).
2. Variation in body size associated with maturity can influence fitness around the time of the adolescent growth spurts and sexual maturation. There is considerable variation among individuals during this maturation period. In adequately nourished children, the timing is largely determined by genetics. Within a given age group of early adolescent children, there will be great variation in the maturation level.

This variation in size will influence performance on fitness tests. Adolescents boys show a clear growth spurt in muscle mass, strength, power, and endurance and a decrease in subcutaneous fat on the arms and legs. Girls show considerably smaller growth spurts in strength, power, and endurance and tend to accumulate body fat compared to boys. In this age-group children may experience an increase or decrease in their abilities to perform on certain test items completely independent of their levels of physical activity.

In addition to being influenced by maturity, a child's response to training is also determined by genetic background. Some children will improve performance more rapidly than others; and some will be able to perform at a much higher level, regardless of training levels.

AEROBIC CAPACITY

Aerobic capacity indicates the ability of the respiratory, cardiovascular, and muscular systems to take up, transport, and utilize oxygen during exercise and activity. A laboratory measure of maximum oxygen uptake is generally the best measure of aerobic capacity.

A low score on the field test estimates of aerobic capacity may be influenced by many factors. These include:

- ▶ actual aerobic capacity level,
- ▶ body composition,
- ▶ running/walking efficiency and economy,
- ▶ motivation level during the actual testing experience,

- extreme environmental conditions,
- ability to pace on the one mile run/walk, and
- innate ability.

Improvement in any of these factors may improve the test score.

Aerobic capacity can be improved substantially in an unconditioned person who participates regularly in sustained activities involving large muscle groups. The amount of improvement is related to the beginning level of fitness and to the intensity, duration, and frequency of the training. The majority of the improvement will occur during the first six months. Thereafter, improvement will be much lower. Boys and girls who are overfat may expect an improvement in the aerobic capacity measure with a reduction in body fat.

For boys, aerobic capacity relative to body weight stays relatively constant during the growing years. For girls, aerobic capacity tends to remain constant between ages 5 and 10 years but decreases after age 10 years due to increasing sex-specific, essential fat.

One Mile Walk/Run and PACER test scores tend to improve progressively with age in boys because running economy improves. In girls up to ages 10-12 years, these field test scores also tend to improve due to improved running economy, but between ages 12 and 18, scores tend to remain relatively constant because improved running economy is offset by declining maximum oxygen uptake expressed relative to body weight.

Muscle Strength, Endurance, And Flexibility

Students who score poorly on one or more areas of muscle strength, endurance, and flexibility should be encouraged to participate in strengthening and stretching activities that will develop those areas. However, it is essential to remember that physical fitness training is very specific and the areas of the body being tested represent only a fraction of the total body.

To focus on activities which develop the extensors of the arms without equal attention to the flexors of the arms will not accomplish the important objective which is to develop an overall healthy musculoskeletal system. Remember, you must have **strength and flexibility** in the muscles on **both sides** of every joint. A useful activity for all students is to identify exercises to strengthen and stretch the muscles at every major joint of the trunk, upper body, and lower body.

Poor performance on the measures of abdominal strength and trunk extensor strength and flexibility may merit special attention. Lack of strength and flexibility in these areas may contribute to low back pain which affects millions of people, young and old.

Fitness Programming

Regular physical activity produces wellness-related fitness. It is impossible to develop lifelong wellness-related fitness without participating in regular physical activity. Fitness cannot be stored away for use at a later date. Students who develop high levels of fitness during their school years will probably not be physically fit at age 50 if they do not continue to participate in regular physical activity.

The Virginia Wellness-Related Fitness Testing Program is based on the belief that wellness-related fitness is for everyone, is for a lifetime, and is fun. The primary objective of a fitness development program should be establishing regular activity habits through enjoyable fitness experiences (ACSM, 1988). This section provides general background information on behavioral and physiological principles necessary for accomplishing this objective.

The overall, long-term fitness objective for all students should be to develop or maintain a level of fitness within the Wellness Fitness Zone. For most students, being healthy is not a meaningful objective. Children generally enjoy a high level of health. The focus for children and youth will, of necessity, needs to have objectives that are more related to their daily lives. Generally, students will respond to objectives such as looking good, feeling good, improved academic performance, and enjoying life more. However, it is important that students also know that the primary need for physical activity and fitness is that it relates directly to wellness and the prevention of numerous chronic degenerative diseases.

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Most students are very involved in physical activity during the earliest school years. As children age they develop diverse interests requiring time and attention. It is important for all children to understand that physical activity is necessary for good health and that it does not require a tremendous amount of activity; or time to maintain a healthy fitness level (Blair et al., 1989; Duncan et al., 1991). Even those students who are not athletes and are not necessarily attracted to physical activity can easily do an adequate amount of activity to be healthy. While it is known that regular physical activity can reduce chronic disease risk factors such as obesity, elevated cholesterol, and hypertension, such information is not likely to motivate children (Malina, 1990).

Changing Behavior

Many theories and very few answers exist regarding the best method for helping children establish physical activity habits. The focus should be on establishing patterns of regular physical activity. When achieved, the regular activity will naturally result in fitness. The following is a brief summary of several principles of health behavior change that may be useful (Sallis, 1989; Sallis and Nader, 1990).

- ▶ Provide a rationale for regular physical activity. Have students share reasons to be active. Make certain that they cover the “here and now” benefits of looking good, feeling good, achieve better grades, and enjoying life more.
- ▶ Provide feedback regarding current status. Test results should be used to select areas for improving or maintaining good performance.
- ▶ Encourage students to establish short-term and long-term goals. Short-term

goals are probably most important and should be goals related to activity rather than goals related to fitness achievement. Rather than a goal of 5 more sit-ups on the next test, a more appropriate process goal would be to perform abdominal strengthening activities 3-4 times each week. If a student works hard toward improving his/he fitness but does not manage to achieve the “product” goal the result is a feeling of failure. A process goal would allow the student to achieve success while slowly making progress toward the desired result.

- ▶ Help each student identify a regular time and place to fit physical activity into the daily schedule. Talk about fitting activities into daily routines such as walking or biking to school, to a friend’s house, or to the store. Part of making time for activity may be less time watching TV or playing video games.
- ▶ Have students make a written commitment to participate in the activity required to achieve the goal. The activity should be enjoyable to the student. The list of activities should be specific listing of type of activity, day of week, time of day, place, and other specific details.
- ▶ Encourage students to keep track of their participation on some type of exercise log.
- ▶ Periodically ask students about their progress, showing that you are seriously interested in the program.
- ▶ Discuss progress and problems. Being active is not easy. If a student is having difficulty meeting a goal, ask other students to suggest solutions.
- ▶ Praise students for even small accomplishments in their efforts to achieve their goals. Feedback on success is very important in making children feel competent and thus establishing intrinsic motivation.
- ▶ Recognize student achievement of activity goals through the use of rewards, awards, stickers on a wall chart, posting names on success charts, etc.
- ▶ Have students identify exercise partners.
- ▶ Recommend activities that are of low to moderate intensity and are more likely to be maintained over a long period. Activities such as walking and recreational bike riding are examples.
- ▶ Involve parents as much as possible. Let them know about child’s goals.
- ▶ Ideally, families should try to do activities together. Evening and weekend outings are fun and enjoyable. However, family members should not be forced to participate. If the whole family cannot participate together, encourage activity in pairs.
- ▶ If families do not do activities together, encourage family support. Praise and encouragement are more effective than nagging. Parents can transport children to activity sessions; children can help parents with chores so parents have time for activity.
- ▶ Be a role model by including regular activity as a part of your lifestyle. Tell your students about your enjoyment of physical activity and its benefits.

Physiological Principles of Fitness

Physical fitness development, whether aerobic capacity, muscular strength and endurance, or flexibility, follows several general physiological principles. Table 2 summarizes the physiological principles of fitness development. Any program designed to improve or maintain fitness should be designed with these principles in mind.

Physical fitness programs should be **individualized** as much as possible in order to consider the unique needs and initial fitness status of the participants. The entire class may be participating in the same activity; however, each student must be allowed the opportunity to work at an intensity which is appropriate to his/her own capabilities and needs. For example, the class may be participating in upper body strength activities, some of the students may be doing full push-ups, others may be doing straight arm support activities, and still others may be doing push-ups against the wall. Each student should be taught how to vary the exercise in order to work at a level which is challenging enough to stimulate training benefits but not so hard as to cause adverse effects such as extreme muscle soreness, undue fatigue, or injury. Teachers should always provide an environment which encourages and allows individual variation.

The principles included within this manual are very general in nature. Teachers are encouraged to consult Corbin and Lindsey (1990), Corbin and Pangrazi (1989), Franks and Howley (1989), Gabbard, LeBlanc, and Lowry (in press), McKenzie (1985), Pangrazi and Dauer (1992), Pangrazi and Dauer (1992), and Pangrazi and Darst (1991) for more specific information regarding physical fitness development.

Table 2 Physiological Principles of Fitness Development

Overload Working the body at a greater workload or resistance, more often, or for a longer period of time results in an improvement in fitness level. Exercise workload is determined by Frequency, Intensity and Time (FIT).

Progression Gradually increasing the workload as the body adapts to a previous level of overload.

FIT Frequency - how often a person exercises, 3 - 4 times per week is generally recommended. Intensity - how hard a person exercises, can refer to heart rate level for aerobic activities, amount of weight being lifted or speed of repetitions of calisthenics. Time- how long (number of minutes of exercise) a person exercises.

General Recommendations For Fit

Aerobic Capacity

- F - 3-4 days per week
- I - 60-80% of maximum aerobic capacity (target heart rate)
- T - 20 - 30 minutes each day

Muscular Flexibility

- F - 3-4 times per week
- I - Stretch to point of discomfort and not beyond
- T - Hold 10 - 60 seconds for 1 - 3 repetitions. Concentrate on lengthening the time of the stretch.

Muscular Strength and Endurance

F - 2-3 times per week

I - *Pre-pubescent: strength and endurance can be developed by using calisthenics and circuits increasing resistance by doing more repetitions or the same number of repetitions in a shorter period of time*

Post -pubescent: weight training may be introduced in very gradual progressions

Use no resistance until proper form is achieved

Increase resistance only 1-3 lbs. at a time always maintaining proper form

T - *1 set of 6-15 repetitions, when can achieve 1 set then 1 to 3 sets*

Dose *Level of overload. Dose necessary for fitness improvement is directly related to initial level of fitness. Less fit individuals require a smaller dose to achieve an increase in fitness. The more fit individual requires ever increasing doses to increase fitness. Dose may remain fairly constant to maintain fitness level.*

Specificity *Training effects are very specific. Aerobic activity is not very beneficial for increasing muscular strength, endurance and flexibility. Likewise, activities to increase muscular strength, endurance and flexibility are not very good in increasing aerobic capacity. Also, the outcome of strength and flexibility activities are very specific to the body part being worked.*

Recognition And Motivation

An integral part of fitness programs is providing motivation to children and youth, which will encourage them to participate in the activity necessary to produce the desired fitness outcomes. Both theory and practical experience make it obvious that the best way to encourage lifetime wellness and fitness is to recognize children and youth who establish regular physical activity behavior.

The following is a brief overview of the two nationally accepted recognition programs. It is recommended that each school division adopt a recognition program that enhances the divisions' wellness objectives for all their students.

The PrudentialFITNESSGRAM

The philosophy of The PrudentialFITNESSGRAM is based on the following concepts:

Fitness is for a lifetime,

Fitness is for everyone, and

Fitness is fun and enjoyable.

The PrudentialFITNESSGRAM has chosen to refer to its system as a "recognition program" rather than an "awards program" because awards often are perceived to be something that is "given" rather than "earned" and because awards may be perceived as something only a select few can receive. The goal is to recognize all students who are physically active and who achieve the Healthy Fitness Zone, not to give awards to a few high achievers.

The PrudentialFITNESSGRAM recognition system focuses on and encourages regular physical activity. It establishes goals which are possible to attain for all students. Used properly it can make fitness testing and activity an enjoyable experience and a logical extension of daily fitness behavior. It provides the basis for sound education regarding essential fitness concepts and motivation to become and stay fit for a lifetime.

Table 3 provides a synopsis of The PrudentialFITNESSGRAM recognition system.

Table 3. The Prudential FITNESSGRAM Recognition System

“It’s Your Move!”

”“It’s Your Move!” For grades K - 6 is an alternative to the usual recognition programs. To achieve this recognition students must perform The Prudential FITNESSGRAM assessment and then complete different physical activities at home, at school, and within the community. Students who complete the requirement are allowed to place their name on the class recognition poster and receive the appropriate certificate. Information about “It’s Your Move!” may be obtained by calling 1-800-635-7050.

Behavior Recognition

“GetFit”

These incentive programs may be used to recognize participants for any of the following activities:

- ▶ Completion of exercise log
- ▶ Achievement of specific goals
- ▶ Fulfillment of contractual agreement

Performance Recognition

“I’m Fit”

This incentive program may be used to recognize participants for any of the following activities:

- ▶ Achievement of Healthy Fitness Zone on 5 of 6 test items or on 4 of 5 test items
- ▶ Improvement in their performance on at least 2 test items.

For more information write or call:
The PrudentialFITNESSGRAM
Cooper Institute for Aerobic research
12330 Preston Rd.
Dallas, TX 75230
1-800-635-7050

The President's Challenge

The President's Challenge is the award program sponsored by The President's Council on Physical Fitness and Sports (PCPFS). This award program offers four individual awards, along with the long-standing State Champion Award for schools that qualify the highest percentage of students for the Presidential Physical fitness Award (PPFA).

The President's Challenge test battery is based primarily on data from the 1985 PCPFS National School Population Fitness Survey conducted for the PCPFS. Students, ages 6-17, who meet the designated percentile standard on all five test items are eligible for the specified award. Table 4 provides the award standards.

Table 4. President's Challenge Award System

The Presidential Physical Fitness Award (PPFA)

The PPFA recognizes an outstanding level of physical fitness. Boys and girls who score at or above the 85th percentile on all five items on the President Challenge are eligible to receive the award.

The National Physical fitness Award (NPFA)

The NPFA recognizes the achievement of a basic, yet challenging level of physical fitness. Boys and girls who score at or above the 50th percentile on all five items on the President Challenge are eligible to receive the award

The Participant Physical Fitness Award

This award recognizes students who attempt all five test items on the President's Challenge but whose scores fall below the 50th percentile on one or more of them.

The Health Fitness Award (HFA)

The HFA recognizes students who reach a healthy level of Fitness. Boys and Girls whose test scores meet or exceed the specified health criteria on each of the test items which comprise the President's Challenge Health fitness Test are eligible for this award.

For more information :

PCPFS

200 Independence Ave. S.W., Room 738 H

Washington, DC 20201

1-800-258-8146

<http://www.indiana.edu/~preshal>

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APPENDIX A

Wellness-Related Fitness Zone Charts

Abdominal Strength Wellness-Related Fitness Zone

Girls			
AGE	CURLUPS* (Timed)	CURLUPS** (Cadence)	PARTIAL CURLUPS*
6	20 - 31	2 - 10	10 - 22
7	22 - 32	4 - 14	13 - 24
8	25 - 36	6 - 20	17 - 30
9	27 - 38	9 - 22	20 - 37
10	27 - 38	12 - 26	24 - 33
11	29 - 40	15 - 20	27 - 43
12	31 - 43	18 - 22	30 - 50
13	33 - 44	18 - 32	40 - 59
14	34 - 45	18 - 32	30 - 48
15	32 - 46	18 - 35	26 - 38
16	32 - 43	18 - 35	26 - 49
17	30 - 41	18 - 35	40 - 58

Boys			
AGE	CURLUPS* (Timed)	CURLUPS** (Cadence)	PARTIAL CURLUPS*
6	19 - 33	2 - 10	10 - 22
7	24 - 34	4 - 14	13 - 24
8	28 - 38	6 - 20	17 - 30
9	29 - 40	9 - 24	20 - 37
10	32 - 43	12 - 24	24 - 35
11	34 - 45	15 - 28	26 - 43
12	37 - 48	18 - 36	32 - 54
13	39 - 51	21 - 40	39 - 59
14	41 - 54	24 - 45	40 - 62
15	41 - 55	24 - 47	45 - 75
16	40 - 53	24 - 47	37 - 73
17	40 - 53	24 - 47	42 - 66

* PCPFS: Number on left is the 35th percentile; number on right is the 80th percentile

** Prudential FitnessGram: left number is lower end of HFZ; number on right is upper end of HFZ

Aerobic Capacity Wellness-Related Fitness Zone

Girls			
AGE	ONE MILE RUN/WALK (MIN:SEC)	1/4 MILE* 1/2 MILE* (MIN:SEC)	PACER** (# LAPS)
6	14:45 - 11:37*	2:50-2:00	N/A
7	14:04 - 10:55*	2:40-1:55	N/A
8	13:31 - 10:20*	5:35-3:58	N/A
9	12:48 - 10:03*	5:25-3:53	N/A
10	12:30 - 9:30**	N/A	7 - 35
11	12:00 - 9:00**	N/A	9 - 37
12	12:00 - 9:00**	N/A	13 - 40
13	11:30 - 9:00**	N/A	15 - 42
14	11:00 - 8:30**	N/A	18 - 44
15	10:30 - 8:00**	N/A	23 - 50
16	10:00 - 8:00**	N/A	28 - 56
17	10:00 - 8:00**	N/A	34 - 61

Boys			
AGE	ONE MILE RUN/WALK (MIN:SEC)	1/4 MILE* 1/2 MILE* (MIN:SEC)	PACER** (# LAPS)
6	14:11 - 10:32*	2:30 - 1:55	N/A
7	12:50 - 9:43*	2:20 - 1:48	N/A
8	12:08 - 9:00*	4:45 - 3:30	N/A
9	11:20 - 8:47*	4:45 - 3:30	N/A
10	11:30 - 9:00**	N/A	17 - 55
11	11:00 - 8:30**	N/A	23 - 61
12	10:30 - 8:00**	N/A	29 - 68
13	10:00 - 7:30**	N/A	35 - 74
14	9:30 - 7:00**	N/A	41 - 80
15	9:00 - 7:00**	N/A	46 - 85
16	8:30 - 7:00**	N/A	52 - 90
17	8:30 - 7:00**	N/A	57 - 94

* PCPFS: Number on left is the 35th percentile; number on right is the 80th percentile

** Prudential FitnessGram: left number is lower end of HFZ; number on right is upper end of HFZ

Upper Body Strength** Wellness-Related Fitness Zone

Girls

AGE	PULL-UPS (# Completed)	PUSH-UPS (# Completed)	FLEXED ARM HANG (seconds)
-----	---------------------------	---------------------------	---------------------------------

6	1 - 2	3 - 8	2 - 8
7	1 - 2	4 - 10	3 - 8
8	1 - 2	5 - 13	3 - 10
9	1 - 2	6 - 15	4 - 10
10	1 - 2	7 - 15	4 - 10
11	1 - 2	7 - 15	6 - 12
12	1 - 2	7 - 15	7 - 12
13	1 - 2	7 - 15	8 - 12
14	1 - 2	7 - 15	8 - 12
15	1 - 2	7 - 15	8 - 12
16	1 - 2	7 - 15	8 - 12
17	1 - 2	7 - 15	8 - 12

Boys

AGE	PULL-UPS (# Completed)	PUSH-UPS (# Completed)	FLEXED ARM HANG (seconds)
-----	---------------------------	---------------------------	---------------------------------

6	1 - 2	3 - 8	2 - 8
7	1 - 2	4 - 10	3 - 8
8	1 - 2	5 - 13	3 - 10
9	1 - 2	6 - 15	4 - 10
10	1 - 2	7 - 20	4 - 10
11	1 - 3	8 - 20	6 - 13
12	1 - 3	10 - 20	10 - 15
13	1 - 4	12 - 25	12 - 17
14	2 - 5	14 - 30	15 - 20
15	3 - 7	16 - 35	15 - 20
16	5 - 8	18 - 35	15 - 20
17	5 - 8	18 - 35	15 - 20

** Prudential FitnessGram: left number is lower end of HFZ; number on right is upper end of HFZ

Flexibility Wellness-Related Fitness Zone

Girls			
AGE	BACK-SAVER** SIT & REACH (inches)	V-SIT REACH* (inches)	SIT & REACH* (centimeters)
6	9+	1.0 - 5.0+	25 - 31
7	9+	1.0 - 4.5+	26 - 31
8	9+	1.0 - 4.0+	25 - 32
9	9+	1.0 - 5.0+	25 - 32
10	9+	1.0 - 5.0+	26 - 32
11	10+	1.5 - 6.0+	26 - 33
12	10+	2.0 - 6.0+	27 - 35
13	10+	2.0 - 6.0+	27 - 37
14	10+	3.0 - 7.0+	30 - 39
15	12+	3.0 - 7.5+	32 - 42
16	12+	4.0 - 8.0+	32 - 41
17	12+	3.0 - 7.5+	33 - 41

Boys			
AGE	BACK-SAVER** SIT & REACH (inches)	V-SIT REACH* (inches)	SIT & REACH* (centimeters)
6	8+	1.0 - 3.0+	24 - 30
7	8+	1.0 - 3.0+	23 - 29
8	8+	0.5 - 2.5+	23 - 30
9	8+	1.0 - 3.0+	23 - 30
10	8+	1.0 - 3.0+	22 - 29
11	8+	1.0 - 4.0+	23 - 30
12	8+	1.0 - 3.0+	23 - 30
13	8+	0.5 - 3.0+	23 - 32
14	8+	1.0 - 4.0+	25 - 34
15	8+	1.0 - 5.0+	27 - 36
16	8+	1.5 - 5.5+	27 - 37
17	8+	1.5 - 6.0+	31 - 40

* PCPFS: Number on left is the 35th percentile; number on right is the 80th percentile

** Prudential FitnessGram: left number is lower end of HFZ; number on right is upper end of HFZ

APPENDIX B

Body Composition

Body Composition

The body composition test results provide an estimation of the percent of a student's weight that is fat in contrast to fat free body mass (muscles, bones, organs). Maintaining appropriate body composition is vital in preventing the onset of obesity which is associated with increased risk of coronary heart disease, stroke, and diabetes. Children and youth with levels of fat greater than 25 and 30% for boys and girls, respectively, have greater risks of developing primary risk factors of heart disease including high blood pressure and elevated cholesterol (Williams et al, 1992).

Research indicates that today's young people are fatter than in previous years (Pate et al, 1985; Gortmaker et al, 1987; Ross et al, 1987; Lohman, 1992). The development of appropriate nutritional and behavioral patterns is important to reverse the trend of increasing fatness of our children and youth. A number of methods for estimating body composition in children and youth have been developed including underwater weighing, total body water, anthropometry, bioelectrical impedance and height and weight. Each approach has some limitations leading to measurement errors of $\pm 3\%$ in the estimate of percent fat. Estimates based on height and weight result in measurement errors of ± 5 to 6% fat (Lohman, 1987; Lohman, 1992). Because of the lower prediction errors and the fact that skinfolds are a more direct estimate of body fatness than body mass index which also reflects muscle and bone mass, the recommended test option is the measurement of triceps and calf skinfolds.

Skinfold Measurements

Test Objective: To measure the triceps and calf skinfold thicknesses for calculation of the percent of body fatness.

Equipment/Facilities: A skinfold caliper is necessary to perform this measurement. Costs of calipers range from \$5-\$200. Both the expensive and inexpensive calipers have been shown to be effective for use by teachers who have had sufficient training and practice.

Testing Procedures: The triceps and calf skinfolds have been chosen because they are easily measured and are highly correlated with total body fat. The skinfold fat measure consists of a double layer of subcutaneous fat and skin.

Measurement Location: The triceps skinfold is measured on the back of the arm over the triceps muscle of the right arm midway between the elbow and the acromion process of the scapula. Pinching the fold (vertically) slightly above the midpoint will ensure that the fold is measured right on the midpoint. The calf skinfold is measured on the inside of the right leg at the level of the maximal calf girth. The right foot is placed flat on an elevated surface with the knee flexed at a 90° angle. The verticle skinfold should be grasped just above the level of maximal girth and the measurement made below the grasp maximal girth.

Measurement Technique:

- Skinfolds should be measured on the right side of the body.
- Instruct the student to relax arm or the leg being measured.
- Firmly grasp the skinfold between the thumb and forefinger and lift it away from the other body tissue. The grasp should not be so firm as to be painful.
- Place caliper 1/2 inch below the pinch site.
- Caliper should be placed in the middle of the fold.
- The recommended procedure is to do one measurement at each site before doing the second measurement at each site and finally the third set of measurements.

Scoring: The skinfold measure is registered on the dial of the caliper. Each measurement should be taken three times with the recorded score being the median (middle) of the three scores. To illustrate: if the readings were 7.0, 8.0, 9.0 the score would be recorded as 8.0 mm. Each reading should be recorded to the nearest .5 millimeter. Total the measurements from each site. To determine the body composition of the student, consult the Body Composition Chart at the end of this section.

$$\text{Tricep(mm)} + \text{Calf(mm)} = \text{Skinfold Total}$$

Suggestions for Test Administration:

- Skinfolds should be measured in a setting that provides the child with privacy.
- Interpretation of the measurements may be given in a group setting as long as individual results are not identified.
- Whenever possible, it is recommended that the same tester administer the skinfold measurement on the same students at subsequent testing periods.
- Practice measuring the sites with another tester and compare results with the same students.

As you become familiar with the methods you will find agreement within 10% between testers.

Body Mass Index

The body mass index (BMI) provides an indication of the appropriateness of a child's weight relative to height. Body mass index is determined by the following formula:

$$\text{Weight(kg)/Height (m)}^2$$

An example would be a student weighing 100 pounds and 5 feet in height would have a body mass index of 19.7. Another student weighing the same 100 pounds but 5 feet 2 inches tall would have a body mass index of 18.3.

Recommended BMI scores are listed on the chart in this section. A score which is classified as “Needs Improvement” generally indicates that a child weighs too much for his/her height. Body Mass Index is not the recommended procedure for determining body composition because it does not estimate the percent of fat, it merely provides information on the appropriateness of the weight relative to the height. For those children found to be too heavy for their height, a skinfold test would clarify if the weight was due to excess fat.

Body Composition For Special Populations

The field assessment for body fatness utilizes the triceps and calf skinfold thicknesses. Skinfold measurements of subcutaneous fat on students with scar tissue at these locations should not be used to estimate body fat. In addition, skinfold measurements at sites where students receive repeated subdural and/or intramuscular injections should not be used. Also, limbs that have muscle atrophy should not be used.

The procedures outlined for body composition in this section indicate that all skinfold measurements should be made on the right side of the body. If problems preclude measurement of skinfold thicknesses on the right side of the body, then it is permissible to take measurements on the left side. In some cases, it may be necessary to mix measurements from both the right and left sides of the body. The mixing of measurements for the two sides of the body is preferable to no measurement or to the measurement of a single site. If only a single site can be measured, the norms presented in Johnston et al (1972, 1974) may be used. If, on the other hand, none of the sites can be measured, the teacher should measure a vertical skinfold on the abdomen two inches to the right of the umbilicus. This site can only serve as a reference point for the student for future measurements. If this skinfold increases over time, the student probably has an increase in total body fat. A decrease in this measure may indicate a decrease in total body fat.

Body Composition Scores

Body composition standards have been established for both Percent Body Fat calculated from triceps and calf skinfold measurements and Body Mass Index calculated from measurements of weight and height. The standards represent the boundaries of the health zone (HZ). Scores that fall outside this zone, either below or above, should receive attention as these students have greater potential to develop health problems related to their level of fatness or leanness.

The charts at the end of this section have been adapted to indicate the (HZ) for both percent fat and body mass index. The HZ begins at 25% fat for the boys (20-27.8 BMI depending on age) and 32% fat for girls (21-27.3 BMI depending on age). Please notice that there is an *optimal range* with the HZ. Ideally students should strive to be within this optimal range which is 10-20% fat for boys and 12-25% fat for girls. Using this chart may simplify the explanation of the body composition assessment item. A Body Mass Index in the “Needs Improvement” range indicates that the student’s weight is too heavy for the height.

When interpreting body composition scores it is important to remember the following:

- skinfold measurements offer an **estimate** of body fatness,
- a 3-5% body fat measurement error is associated with the skinfold method,
- body mass index provides an **estimate** of the appropriateness of the weight for the height, and
- body mass index may falsely identify a very muscular, lean person as being over fat (too heavy for height) or identify a light weight person with little muscular development but a large percent fat as being acceptable when they are actually overfat.

In general, students who score in the area below the WZ should be encouraged to work toward this area by slowly changing their body weight through increased physical activity and decreased consumption of high fat, high calorie, low nutritional value foods. Changing dietary habits and exercise habits can be most difficult. Students with severe obesity or eating disorders may need professional assistance in their attempts to modify these aspects of their lifestyle.

It is important to remember in interpreting body composition results that most students who are overfat may also have performances in other test areas which are outside the WZ. An improvement in body composition will generally result in an improved performance in aerobic capacity and also muscles strength and endurance, especially in the upper body, due to a reduction in excess weight.

For children above the age of twelve years, who are very lean which is (below 8% fat for boys (less than 13.1-17.0 BMI depending on age) and below 13% fat for girls (less than 14.1-15.0 BMI depending upon age) teachers may want to convey a message indicating that being this lean may not be best for health. Parents and teachers should notice students who are categorized as being very lean and consider factors that may be responsible for their low level of body fat. Many students may naturally be very lean while others may have inappropriate nutritional patterns. A few students may be suffering from an eating disorder. A factor to consider is whether the student's level of fat has suddenly changed from within the optimal range to a level identified as very lean. Severe **changes** may signal a potential problem. Creating awareness of a child's current status is the primary purpose in identifying very lean students. Changes in status should be monitored.

The body composition results can be very helpful in allowing students to follow changes in their levels of body fat over time. Obesity is a health problem both for children and adults. Childhood is the most appropriate time to address problems or potential problems and attempt to make the necessary behavior change to remediate problems in this area of wellness-related fitness. Educating children and their parents about body composition and its relationship to physical activity and diet has shown long term effects on reducing body fatness in children (Epstein, 1990).

Body Composition Conversion Chart

Girls

* % Fat figures within Healthy Fitness Zone are **bold**.

Total MM	% FAT	Total MM	% FAT	Total MM	% FAT	Total MM	% FAT	Total MM	% FAT
1.0	5.7	16.0	14.9	31.0	24.0	46.0	33.2	61.0	42.3
1.5	6.0	16.5	15.2	31.5	24.3	46.5	33.5	61.5	42.6
2.0	6.3	17.0	15.5	32.0	24.6	47.0	33.8	62.0	42.9
2.5	6.6	17.5	15.8	32.5	24.9	47.5	34.1	62.5	43.2
3.0	6.9	18.0	16.1	33.0	25.2	48.0	34.4	63.0	43.5
3.5	7.2	18.5	16.4	33.5	25.5	48.5	34.7	63.5	43.8
4.0	7.5	19.0	16.7	34.0	25.8	49.0	35.0	64.0	44.1
4.5	7.8	19.5	17.0	34.5	26.1	49.5	35.3	64.5	44.4
5.0	8.2	20.0	17.3	35.0	26.5	50.0	35.6	65.0	44.8
5.5	8.5	20.5	17.6	35.5	26.8	50.5	35.9	65.5	45.1
6.0	8.8	21.0	17.9	36.0	27.1	51.0	36.2	66.0	45.4
6.5	9.1	21.5	18.2	36.5	27.4	51.5	36.5	66.5	45.7
7.0	9.4	22.0	18.5	37.0	27.7	52.0	36.8	67.0	46.0
7.5	9.7	22.5	18.8	37.5	28.0	52.5	37.1	67.5	46.3
8.0	10.0	23.0	19.1	38.0	28.3	53.0	37.4	68.0	46.6
8.5	10.3	23.5	19.4	38.5	28.6	53.5	37.7	68.5	46.9
9.0	10.6	24.0	19.7	39.0	28.9	54.0	38.0	69.0	47.2
9.5	10.9	24.5	20.0	39.5	29.2	54.5	38.3	69.5	47.5
10.0	11.2	25.0	20.4	40.0	29.5	55.0	38.7	70.0	47.8
10.5	11.5	25.5	20.7	40.5	29.8	55.5	39.0	70.5	48.1
11.0	11.8	26.0	21.0	41.0	30.1	56.0	39.3	71.0	48.4
11.5	12.1	26.5	21.3	41.5	30.4	56.5	39.6	71.5	48.7
12.0	12.4	27.0	21.6	42.0	30.7	57.0	39.9	72.0	49.0
12.5	12.7	27.5	21.9	42.5	31.0	57.5	40.2	72.5	49.3
13.0	13.0	28.0	22.2	43.0	31.3	58.0	40.5	73.0	49.6
13.5	13.3	28.5	22.5	43.5	31.6	58.5	40.8	73.5	49.9
14.0	13.6	29.0	22.8	44.0	31.9	59.0	41.1	74.0	50.2
14.5	13.9	29.5	23.1	44.5	32.2	59.5	41.4	74.5	50.5
15.0	14.3	30.0	23.4	45.0	32.6	60.0	41.7	75.0	50.9
15.5	14.6	30.5	23.7	45.5	32.9	60.5	42.0	75.5	51.2

Body Composition Conversion Chart

Boys

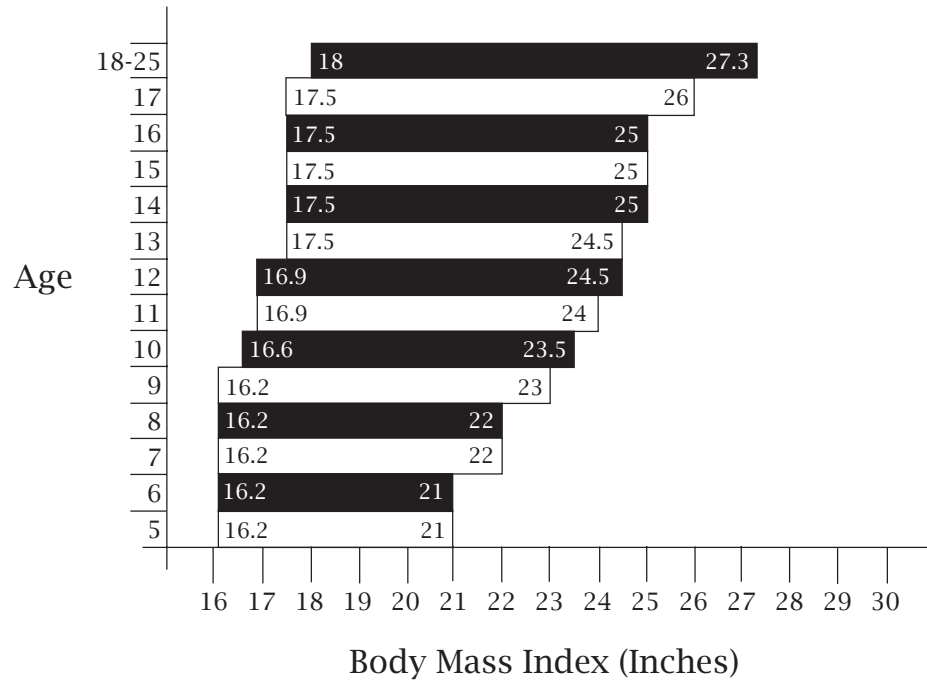
* % Fat figures within Healthy Fitness Zone are **bold**.

Total MM	% FAT	Total MM	% FAT	Total MM	% FAT	Total MM	% FAT	Total MM	% FAT
1.0	1.7	16.0	12.8	31.0	23.8	46.0	34.8	61.0	45.8
1.5	2.1	16.5	13.1	31.5	24.2	46.5	35.2	61.5	46.2
2.0	2.5	17.0	13.5	32.0	24.5	47.5	35.5	62.0	46.6
2.5	2.8	17.5	13.9	32.5	24.9	47.5	35.9	62.5	46.9
3.0	3.2	18.0	14.2	33.0	25.3	48.0	36.3	63.0	47.3
3.5	3.6	18.5	14.6	33.5	25.6	48.5	36.6	63.5	47.7
4.0	3.9	19.0	15.0	34.0	26.0	49.0	37.0	64.0	48.0
4.5	4.3	19.5	15.3	34.5	26.4	49.5	37.4	64.5	48.4
5.0	4.7	20.0	15.7	35.0	26.7	50.0	37.8	65.0	48.8
5.5	5.0	20.5	16.1	35.5	27.1	50.5	38.1	65.5	49.1
6.0	5.4	21.0	16.4	36.0	27.5	51.0	38.5	66.0	49.5
6.5	5.8	21.5	16.8	36.5	27.8	51.5	38.9	66.5	49.9
7.0	6.1	22.0	17.2	37.0	28.2	52.0	39.2	67.0	50.2
7.5	6.5	22.5	17.5	37.5	28.6	52.5	39.6	67.5	50.6
8.0	6.9	23.0	17.9	38.0	28.9	53.0	40.0	68.0	51.0
8.5	7.2	23.5	18.3	38.5	29.3	53.5	40.3	68.5	51.3
9.0	7.6	24.0	18.6	39.0	29.7	54.0	40.7	69.0	51.7
9.5	8.0	24.5	19.0	39.5	30.0	54.5	41.1	69.5	52.1
10.0	8.4	25.0	19.4	40.0	30.4	55.0	41.4	70.0	52.5
10.5	8.7	25.5	19.7	40.5	30.8	55.5	41.8	70.5	52.8
11.0	9.1	26.0	20.1	41.0	31.1	56.0	42.2	71.0	53.2
11.5	9.5	26.5	20.5	41.5	31.5	56.5	42.5	71.5	53.6
12.0	9.8	27.0	20.8	42.0	31.9	57.0	42.9	72.0	53.9
12.5	10.2	27.5	21.2	42.5	32.2	57.5	43.3	72.5	54.3
13.0	10.6	28.0	21.6	43.0	32.6	58.0	43.6	73.0	54.7
13.5	10.9	28.5	21.9	43.5	33.0	58.5	44.0	73.5	55.0
14.0	11.3	29.0	22.3	44.0	33.3	59.0	44.4	74.0	55.4
14.5	11.7	29.5	22.7	44.5	33.7	59.5	44.7	74.5	55.8
15.0	12.0	30.0	23.1	45.0	34.1	60.0	45.1	75.0	56.1
15.5	12.4	30.5	23.4	45.5	34.4	60.5	45.5	75.5	56.5

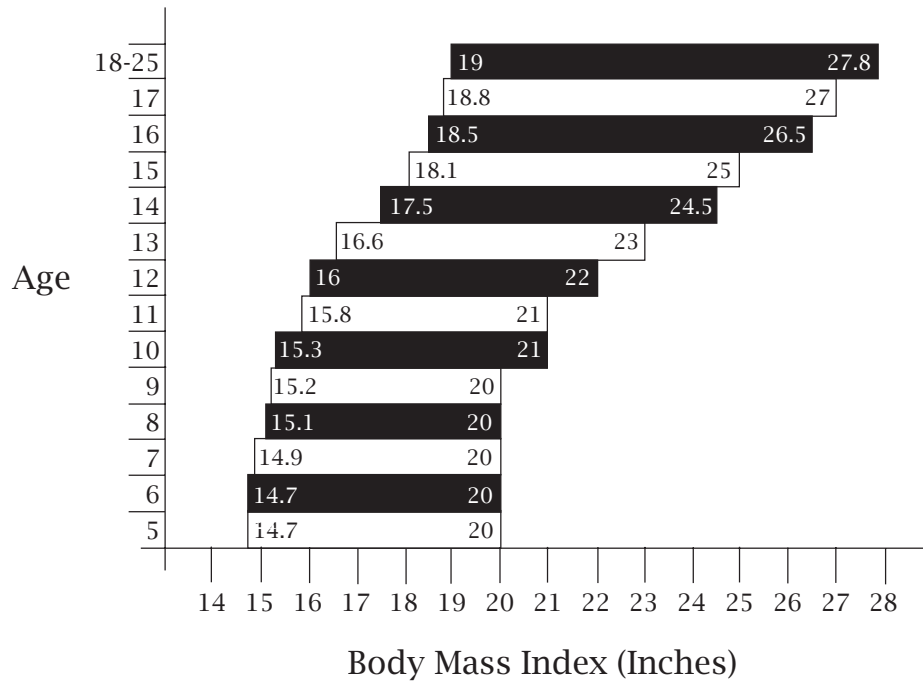
Body Composition Classification

* These charts represent the 'Healthy Fitness Zone' for specified ages

GIRLS



BOYS



APPENDIX C

Wellness -Related Fitness Testing Form

APPENDIX D

Resources

Measuring Strip for Curl-up Test

3"	Curl-up Measuring Strip	Ages 5-9 years
___30" or more_____		

4 1/2 "	Curl-up Measuring Strip	Ages 10-17+ years
___30" or more_____		

Other Suggestions for Measuring Curl-up Distances

There are any number of methods to measure the distance traveled in the curl-up test. The important factor is to ensure that the student is moving the fingertips 3" for ages 5-9 years and 4 1/2" for ages 10-17+. Another factor to consider is that the student should be able to "feel" the stopping point rather than rely on "seeing" it. Do not be afraid to experiment with other methods to measure this distance.

1. Use tape and a pencil to indicate the marks. Put tape on the mat at the starting point for the fingertips. Tape a pencil to the mat parallel to the starting line at the stopping point (3" or 4 1/2").
2. Use tape and a yardstick to indicate the marks. Put tape on the mat at the starting point for the fingertips. Have the third partner standing astride the person doing curl-ups secure a yardstick placed on the mat under the knees and parallel to the starting line. The yardstick should be placed either 3" or 4 1/2" from the starting line.
3. Permanent measuring strips like those pictured above could be cut from a sheet of 1/4" plywood. These would need to be carefully sanded to prevent splinters. Laminated poster board would also provide more permanent measuring strips.
4. Measuring cards could be cut the appropriate width (3" or 4 1/2") out of index cards. Two would be needed for every two students. Cards would need to be taped to the mat in position for student to slide the fingers from one edge of the card to the other.

Equipment for Back Saver Sit and Reach

1. Using any sturdy wood or comparable material (3/4 inch plywood seems to work well) cut the following pieces:

2 pieces - 12 in. x 12 in.
 2 pieces - 12 in. x 10 1/2 in.
 1 piece - 12 in. x 22 in.

2. Cut pieces that are 10 in. x 4 in. from each side of one end of the 12 in. x 22 in. piece to make the top of the box (see diagram). Beginning at the small end make marks on the piece every inch up to 12 inches.
3. Construct a box using nails or screws or wood glue from the remaining four pieces. Attach the top of the box. It is crucial that the 9 inch mark be exactly in line with the vertical plane against which the subject's feet will be placed. The 0 inch is at the end that will be nearest the subject.
4. Cover the apparatus with polyurethane sealer or shellac.

Alternate Flexibility Testing Apparatus

1. Find a sturdy cardboard box at least 12 inches tall. Turn the box so that the bottom is up. Tape a yardstick to the bottom. The yardstick must be placed so that the 9 inch mark is exactly in line with the verticle plane against which the subject's feet will be placed and the 0 inch end is nearer the subject.
2. Find a bench which is about 12 inches wide. Turn the bench on its side. Tape a yardstick to the bench so the 9 inch mark is exactly in line with the verticle plane against which the subject's feet will be placed and the 0 inch end is nearer the subject.

Source of Testing Equipment

The PACER Music Tape And Wall Chart

The Prudential Fitnessgram
 Cooper Institute for Aerobics Research
 12330 Preston Rd.
 Dallas, TX 75230
 1-800-635-7050

Country Technology
 P. O. Box 87
 Gay Mills, WI 54631
 (608) 735-4718

Adipometers

Skinfold Calipers

Lange Skinfold Calipers
 Cambridge Scientific Industries
 P. O. Box 265
 Cambridge, MD 21613
 1-800-638-9566

The Prudential FITNESSGRAM
 Cooper Institute for Aerobics Research
 12330 Preston Road
 Dallas, TX 75230

Fat Control, Inc.
 P. O. Box 10117
 Towson, MD 21204
 (717) 993-3550

Ross Laboratories
Educational Services Dept.
625 Cleveland Avenue
Columbus, OH 43216
(614) 624-7900

Training Films On Skinfold Measurement

Human Kinetics Publishers, Inc.
Box 5076
Champaign, IL 61825-5076
(217) 351-5076

Teaching and Training Resources

Weight Assisted Pull-up Training Devices

The Pull-up Trainer
Mini-Gym Co.
354 Halle Drive
Cleveland, OH 44132-1024

Baumgartner Pull-up
Cam-Trak, Inc.
1050 Industrial Drive
Watkinsville, GA 30677
(404) 769-4025

Weight Control Program For Kids

SHAPEDOWN
Balboa Publishing
11 Librar
San Anselmo, CA 94960
(415) 453-8886

Physical Fitness Educational Programs

Dynamic Physical Education for
Elementary *School Children*,
Tenth Edition
Robert P. Pangrazi & Victor P. Dauer
Macmillan
866 3rd Avenue
New York, NY 10022

Lesson Plans for Dynamic Physical
Education *for Elementary School
Children, Ninth Edition*
Robert P. Pangrazi & Victor P. Dauer
Macmillan
866 3rd Avenue
New York, NY 10022

Dynamic Physical Education for
Secondary School Students
Robert P. Pangrazi & P. W. Darst
Macmillan
866 3rd Avenue
New York, NY 10022

Fitness for Life

Charles B. Corbin & Ruth Lindsey
Scott, Foresman and Company
1900 East Lake Avenue
Glenview, IL
(708) 729-3000

Fitness Leader's Handbook
B. Don Franks & Edward T. Howley
Human Kinetics Books
Box 5076
Champaign, IL 61825-5076
1-800-747-4457

Physical Education for Children:
Building
The Foundation
Carl Gabbard, Betty LeBlanc &
Susan Lowy
Prentice Hall
Englewood Cliffs, NJ 07632

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